

# **Y Combinator Research**

## **Basic Income Project Proposal**

OVERVIEW FOR COMMENTS AND FEEDBACK

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**FOR MORE INFORMATION** <http://www.ycr.org/basicincome>

# EXECUTIVE SUMMARY

## Universal Basic Income

Basic income is an unconditional cash transfer guaranteed to all individuals—there are no work requirements, means tests, or restrictions on how the money can be spent. Everyone receives the income individually, in an amount sufficient to cover basic needs.

## WHY STUDY BASIC INCOME?

In the United States, **extreme poverty has dramatically increased, income inequality has risen**, and the **middle class is shrinking**. The destabilizing effects of these trends are reflected in increasing political and social divisions. Unfortunately, technological and economic forces that contribute to these trends appear unlikely to subside, and existing social programs have proven insufficient to stem them.

Providing a basic income – giving all Americans enough money to live on with no strings attached – is one potential solution to these ongoing social problems. Research points to negative economic, social, and psychological feedback loops that keep individuals without a steady income “trapped” in poverty. A basic income seeks to break these feedback loops. Interest in basic income has recently skyrocketed, but the debate often relies on conjecture, stereotypes, and studies that are out-of-date, methodologically flawed, or from disparate contexts. **This lack of data and experience impedes rigorous policy analyses and data-driven political debate.**

## OUR PLAN

To help inform academic, policy, and political debates, we plan to conduct an experiment that will quantify the effects of providing a basic income in the US. For our study, we will recruit approximately 3,000 individuals across two US states and randomly assign 1,000 in total to receive \$1,000 per month for 3 to 5 years.

We will conduct extensive quantitative measurement of outcomes related to individuals’ economic, social, and physiological self-sufficiency and well-being, as well as gather data on how individuals use their time and money and how their receipt of a basic income impacts their children and those in their networks. To ensure our measurement strategies are accurate and reflect the latest research, we are partnering with state and local government agencies to measure outcomes with administrative data and working with leading experts in economics, public health, political science, and other fields.

In addition to quantitative analyses, we will conduct in-depth interviews to better understand the mechanisms of impact, individuals’ experiences, their decision-making processes, and the constraints they face. We want to know how the cash generates the observed outcomes and why the effects may vary across participants. At the conclusion of the study, we expect to have both rigorous quantitative answers to important policy questions about basic income and qualitative material that will allow the general public to understand, contextualize, and personalize the results.

A single study cannot answer all questions about basic income, but we view this experiment as a strong foundation for a broader research agenda moving forward.

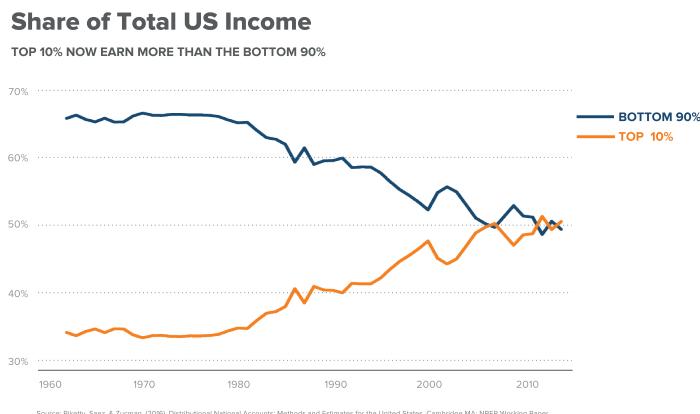
# MOTIVATION

“ At some point, when the problem is not just Uber but driverless Uber, when radiologists are losing their jobs to A.I., then we’re going to have to figure out how do we maintain a cohesive society and a cohesive democracy in which productivity and wealth generation are not automatically linked to how many hours you put in, where the links between production and distribution are broken, in some sense. ”

- PRESIDENT OBAMA after the 2016 presidential election<sup>1</sup>

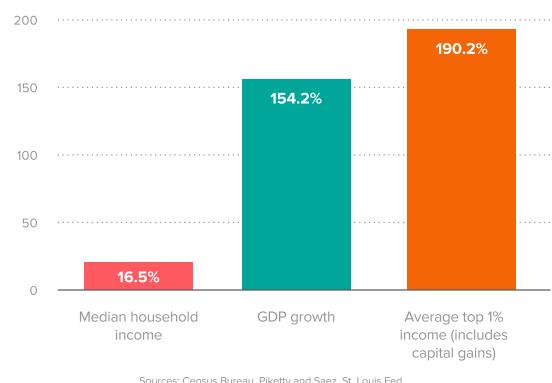
Poverty has long been a pervasive public policy challenge. The number of households with children living in “extreme poverty” – defined using the World Bank’s threshold of individuals living on \$2 or less of cash income per day – has risen dramatically in the United States over the past 15 years.<sup>2</sup> Economic insecurity is not limited to the bottom of the income distribution; the erosion of the middle class is exposing a growing number of Americans to financial precarity.<sup>3</sup> Individuals and communities are struggling as opportunities are increasingly concentrated in urban areas and among the highly skilled. The destabilizing effects of their struggles are reflected in increasing political and social divisions within and between communities.

These trends highlight how existing attempts to address economic insecurity have proven insufficient. Research shows that the social safety net leaves many people cycling in and out of poverty and/or categorically ineligible for aid.<sup>4-6</sup> The patchwork of programs is complex, costly to administer, and difficult to navigate. Take-up rates are often low, particularly among those most in need.<sup>7</sup>



## Growth since 1980

GDP growth has dwarfed median household income



Existing safety net programs are also ill-equipped for the changing nature of work. While most current programs are focused on encouraging people to work, some ostensibly “full time” employment in today’s economy does not provide a minimum level of economic security. A disproportionate number of the jobs added since the 1960s have been low-paying and/or part-time service sector jobs, whereas the number of full-time, high-paying manufacturing jobs has decreased.<sup>8</sup> Likewise, the growth of the “gig” economy is accompanied by inconsistent and unpredictable employment. It is possible for an individual to be employed consistently throughout the year but remain well below the poverty line or at constant risk of falling below it. Finally, due to the complex means tests governing eligibility for many existing social programs, families who do find work often face a difficult trade-off between earnings and the benefits they rely on for survival.

As technological advances continue to automate more low-skill jobs and further disintermediate labor, all these trends appear poised to continue or even accelerate. In this context, attempts to alleviate poverty and promote economic security predicated solely on traditional forms of employment may have important limitations.

## Whose income is most volatile?

PEOPLE WHO EXPERIENCE **MORE THAN A 30% MONTH-TO-MONTH CHANGE IN TOTAL INCOME**

**70%**

Age 18-24

**74%**

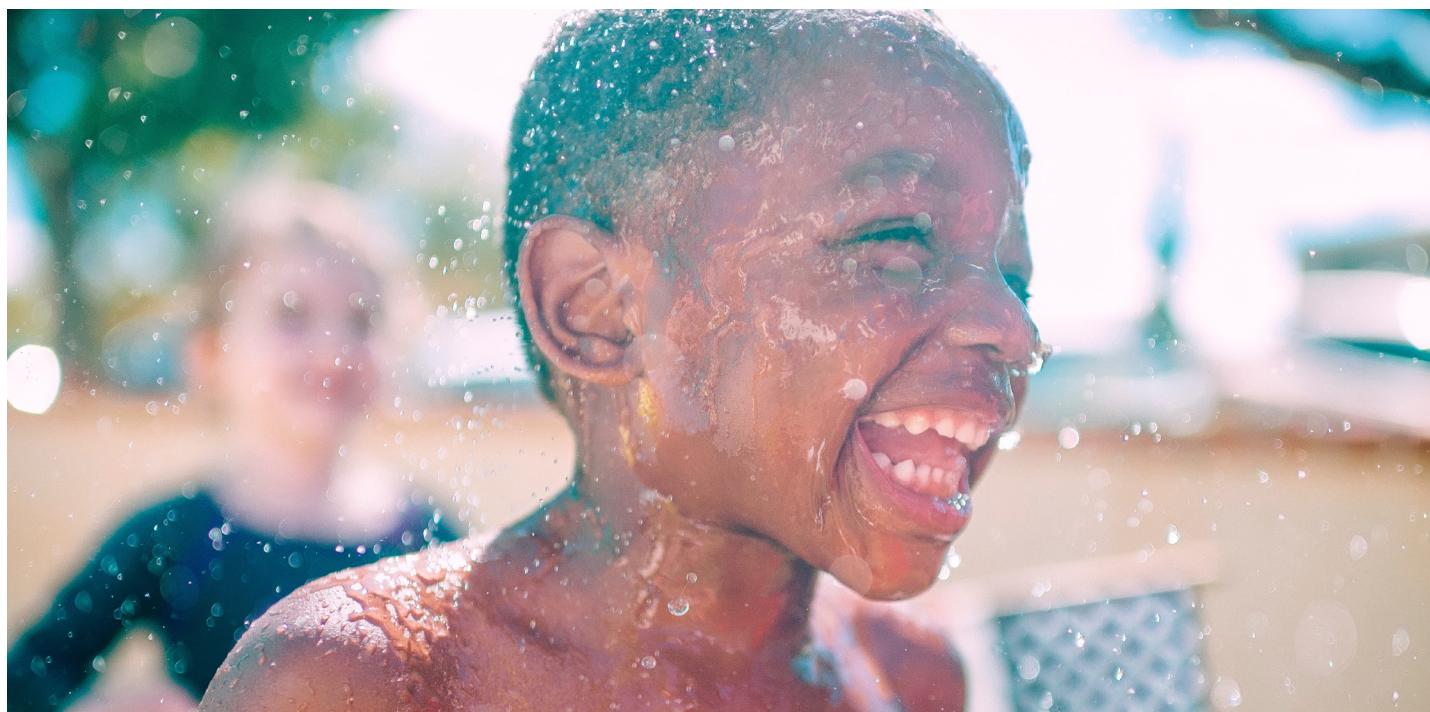
Bottom income quintile

**55%**

National average

Source: JPMorgan Chase Institute

The concept of a basic income—giving all people enough money to live on with no strings attached—is gaining traction across the globe. Results from studies in Canada,<sup>9</sup> Namibia,<sup>10</sup> South Africa,<sup>11</sup> and GiveDirectly's work in Kenya<sup>12</sup> suggest large, positive, and sustained effects across a wide range of outcomes including income, assets, food security, mental and physical health, academic achievement, and living standards.<sup>13-14</sup> In theory, a basic income in the US could address many of the shortcomings associated with some traditional social safety net programs. However, providing a basic income to all Americans would be extremely expensive and its effects in a context such as the US are not fully understood. Basic income is also politically controversial. With an eye toward informing policy, academic, and political debates, we propose the first randomized study of basic income in the US.



# RESEARCH QUESTIONS

We will take a holistic approach to understanding the individual-level effects of basic income to create data that can be broadly applied to help policy-makers and academics improve the effectiveness and efficiency of future social policies and programs.

## 1. TIME USE

**How does receiving a basic income affect the way people spend their time?** Standard economic theory predicts that individuals who are receiving a basic income will spend less time working. What are they doing with that time instead? We will leverage frequent online surveys to obtain detailed pictures of time use – e.g. do hours worked decrease and, if so, do people use the extra time to sleep and engage in more leisure, or do they spend more time with children or pursue further education or training? Do they continue to work but choose lower-paid but more fulfilling or more satisfying jobs? Investments in human and physical capital such as educational outcomes, self-employment, and entrepreneurial activities are also integral to this set of questions.

## 2. SUBJECTIVE WELL-BEING AND OBJECTIVE HEALTH

**What is the effect of a basic income on objective measures of health and subjective measures of well-being?** It is possible that a basic income could increase health and happiness. While our target population is relatively young and unlikely to have many serious health problems, overall physical fitness and healthy behaviors (e.g., physical activity, diet, alcohol consumption, smoking) could theoretically rise or fall in response to receiving cash. As a result, we may expect changes in health and mental health service utilization. We will also measure markers that serve as predictors of later disease as well as cortisol, an indicator of stress. Recognizing the growing literature on cognition and poverty,<sup>15</sup> we will collect data on several cognitive functions (e.g. inhibitory control and attention) and also track potential intermediate outcomes such as sleep, housing quality and stability, and food security.

## 3. FINANCIAL HEALTH

**Does receiving a basic income cause people to pursue behaviors that promote economic self-sufficiency and improvements in financial health?** This study will be able to track financial information, such as transaction-level expenditures, use of credit, and saving behavior, that earlier studies were not able to collect. Using both objective and subjective financial indicators, we will assess the extent to which a basic income promotes resilience to economic shocks, increases households' capacity to make investments with expected future benefits, and reduces reliance on costly coping mechanisms (like payday loans, auto title loans, and pawn shops) to make ends meet.

## 4. TIME AND RISK PREFERENCES

**What is the effect of an increase in income on behavioral decision-making outcomes such as time and risk preferences?** There is a burgeoning literature on how “scarcity” may adversely affect people’s decision-making, leading to worse economic outcomes. By guaranteeing a minimum level of economic security, basic income could decrease certain types of “impulsive” behaviors by reducing tunnel vision and allowing individuals to consider more factors when making decisions. Alternatively, the cushion provided by a basic income could act as a subsidy for risk-taking behaviors

like entrepreneurship, career changes, or investments. Existing studies focus on how immediate stressors affect behavior, and it is not obvious how the effects of a long-term program might differ. On the one hand, we might think that immediate stressors weigh heavily on participants and thus mitigating these immediate stressors would have the largest effect on behavioral outcomes. On the other hand, long-term vulnerability could also be a stressor. Further, it might take time once immediate stressors are removed to develop habits that could further reduce stress or cause one to be more resilient to future shocks.

## 5. POLITICAL AND SOCIAL BEHAVIORS AND ATTITUDES

It is possible that a basic income could cause recipients to lead a more engaged civic life or become more trusting of other people and of institutions. We may expect voter turnout measured by administrative records and other self-reported forms of participation to increase. In addition, a basic income may change political and social attitudes, including measures of trust in government, economic conservatism, intergroup prejudice, and other-regarding preferences.

## 6. CRIME

Criminal activity produces large negative externalities for society and often negatively impacts offenders' lives and families forever. A basic income may reduce crime by reducing the incentive for offending, removing individuals from harmful situations or relationships, or increasing the opportunity cost of incarceration. We will track criminal convictions and arrests using administrative data.

## 7. EFFECT ON CHILDREN

A basic income could have large effects on children living in households who receive it. Since we plan to target individuals both with and without children, we may not have the statistical power to say much about effects on children of specific ages. However, given the importance of the potential effect on children, we will consider whether subjects' children have higher test scores, are more likely to attend school, and show lower levels of stress.



## 8. SPILLOVER AND NETWORK EFFECTS OUTSIDE THE HOUSEHOLD

We also anticipate that the basic income program will have spillover effects and could cause changes in household composition and the structure of networks in the communities in which the program will operate. For example, if individuals choose to leave their jobs, they may refer their friends to those jobs, keeping aggregate employment constant. In addition to soliciting a full list of the residents in a household, we will ask subjects to provide a short list of their closest connections, family or friends. We would like to use administrative data to gauge spillover effects, and we are also interested in changes in social networks as a result of the treatment.

# EXISTING RESEARCH AND UNANSWERED QUESTIONS

## 1970s EXPERIMENTS — FOCUS ON LABOR SUPPLY

Much of the existing literature on unconditional cash transfers in high-income countries focuses on estimating effects on employment, but more recent studies suggest that this early preoccupation with labor supply led us to overlook important effects of unconditional cash transfers on other outcomes. The primary aim of Negative Income Tax (NIT) experiments conducted by the US government in the 1970s was to examine the effect of a guaranteed income on labor force participation, but supplemental analyses revealed positive effects on low birth weights, homeownership, health, children's academic achievement, and the number of adults pursuing continuing education.<sup>16-17</sup> Similarly, a reexamination of Canada's guaranteed annual income experiment in the 1970s using health administration data shows a significant decrease in hospitalizations – particularly due to accident, injury, and mental health concerns – and an overall reduction in health service utilization among guaranteed income recipients relative to controls. These overall improvements in health may lead to significant savings in health system expenditures.<sup>18</sup>

However, the NIT experiments leave open more questions than they answer.<sup>19</sup> Whether these effects would replicate in today's labor market is unknown. These studies suffered from nonrandom selection, nonparticipation, differential attrition, and systematic misreporting that continue to call their results into question.<sup>20-22</sup> The 1970s studies also did not track a number of outcomes that more recent research has suggested capture the benefits of a basic income. In addition to being the first large-scale examination of unconditional cash transfers in the United States, the proposed study will employ research tools unavailable during the NIT experiments to generate a more holistic picture of the effects of the supplemental income on individuals. Tracking expenditures and financial data and leveraging mobile applications and web-based surveys to gather data on time use enable us to investigate whether individuals are able to make investments that promote long-term economic self-sufficiency and build savings to help weather shocks and reduce vulnerability.

## IMPACTS ON HEALTH AND WELL-BEING IN DEVELOPED COUNTRIES

The expansion of the Earned Income Tax Credit (EITC) in the early 1990s provided another opportunity to examine the effects of exogenous increases in income, and an analysis of maternal health before and after the expansion documented improvements in self-reported health and mental health as well as reductions in the counts of risky biomarkers for cardiovascular diseases, metabolic disorders, and inflammation.<sup>23</sup> Another EITC study found reductions in low infant birth weight that may be at least partially attributable to notable decreases in smoking during pregnancy and increases in prenatal care. More generally, the authors highlight that there are positive externalities to safety net programs that may lead policymakers to underestimate the benefits.<sup>24</sup>

Other recent quasi-experimental evidence of responses to exogenous increases in income comes from examinations of Swedish lottery winners and casino disbursements to Native American families in the U.S. The latter reported that an average increase in annual household income of \$1,750 is associated with statistically significant reductions in obesity, hypertension, and diabetes.<sup>25</sup> The Swedish lottery study found that winners consumed fewer mental health medications, particularly those targeting anxiety, after winning.<sup>26</sup> Though they did not report statistically significant changes

in health service utilization and other indicators of health, the generalizability of the results is questionable given the presence of universal health coverage and a more generous social safety net relative to the U.S.

Additional research is needed to examine whether improvements in social welfare outcomes are associated with decreases in social costs (e.g., incarceration, health care, etc.) and future gains in productivity and economic growth that could compensate for any losses associated with work disincentive effects.

## CASH vs. IN-KIND, CONDITIONAL vs. UNCONDITIONAL, AND UNIVERSAL vs. MEANS-TESTED BENEFITS

Proponents of basic income and unconditional cash transfers posit that, unlike conditional or in-kind benefits, unconditional cash gives individuals the freedom to meet their specific needs. As a result, they may be better able to achieve long-term economic self-sufficiency. However, studies testing this claim have been limited to one-time or short-term transfers in developing countries.<sup>27-28</sup> These studies have shown that one-time unconditional cash transfers (UCTs) led to significant improvements in economic outcomes and psychological well-being in the short term.<sup>28</sup>

In the U.S., there have been two recent experiments with conditional cash transfers (CCTs) in New York City and Memphis, Tennessee, but results were mixed. The transfers reduced poverty and led to modest improvements in other areas that varied across sites, but researchers did not observe the gains in academic achievement, employment, and health that they hoped to see.<sup>29-30</sup> Additionally, a disproportionate amount of the cash rewards went to more advantaged families; in households that earned more rewards, parents had higher education levels and were more likely to be employed and married. There are a number of possible explanations for the lack of impact, including challenges with implementation, the complexity of the incentives, the arduous process of documenting participation, and the small amount of money relative to the cost of living.

In the domestic policy context, there has been a shift away from cash welfare in general, and what cash benefits are available are typically conditioned on employment or employment-seeking activities. Implicit in this transition to more conditionality and in-kind benefits is the assumption that recipients cannot be trusted to allocate cash benefits optimally. But do we have evidence that this is the case to an extent that justifies all of the administrative cost and complexity, overlaps in eligibility, lack of integration of benefit schedules, and the time-consuming eligibility and recertification processes that the patchwork of programs require?<sup>31</sup>

Studies on UCTs in developing countries show that cash transfers did not induce spending on alcohol and tobacco,<sup>28,32-35</sup> and researchers examining casino disbursements to Native American families documented a large and statistically significant decrease in both smoking and heavy drinking in response to an average increase of \$1,750 in annual household income.<sup>25</sup> One study uses the Consumer Expenditure Survey to explore how recipients spend their EITC and finds that benefits are frequently directed toward vehicle purchases and transportation spending.<sup>36</sup> Another detailed examination of EITC expenditures among 115 families revealed that, on average, only 11% of the refund goes to “treats,” a category that includes eating out; entertainment; gifts for others; toys, games, and gifts for one’s children; alcohol and cigarettes; and lottery tickets.<sup>37</sup> As the EITC is largely distributed as a lump sum and is only available to individuals who are employed and have children (the benefit for childless individuals is very small), however, findings on expenditures from the EITC may not predict how recipients would respond to monthly unconditional cash benefits.

Benefits provided by many social welfare programs are means-tested, whereas most variants of basic income are universal. Means-tested programs base eligibility—and often the level of benefits—on income and assets, with the goal of directing resources to those most in need, bringing down the cost of the programs, and using available resources to provide greater assistance to the poor than would be possible if the funds were distributed across the population. This approach requires significant institutional capacity and administrative costs to process applications, verify eligibility, and regularly recertify that individuals are meeting the requirements and remain eligible. Applying for benefits requires time and resources and stigmatizes the recipient, and low take-up rates limit the efficiency of targeting.<sup>38-40</sup> Means-testing also imposes an implicit tax on savings, and multiple studies have shown that this discourages saving and distorts households' asset accumulation and investment decisions.<sup>41-42</sup> Many benefits have high marginal tax rates, which generate incentives to work fewer hours, conceal income, or not work at all.<sup>43</sup> Since many households receive multiple benefits, the cumulative tax rates on these programs can be very high.<sup>44</sup> Although a universal basic income funded by higher taxes on higher-earning or higher-wealth individuals would also have an implicit marginal tax rate once an individual's earned income reaches a certain level, there may be fewer distortions and perverse incentives.

## DECISION-MAKING AND COGNITIVE FUNCTION

The proposed study will generate evidence on the causal effect of income on cognitive function, economic decision-making, and economic mobility. The burgeoning literature on poverty and cognition suggests that scarcity causes stress and negativity, inducing people to make shortsighted and risk-averse decisions that perpetuate poverty, but more research is needed to determine causality and explain variations across studies.<sup>45-48</sup> These relationships have important implications for public policy; by contributing to this body of work, this study is relevant not only to basic income but to poverty research and social welfare more generally.

Several studies have produced evidence that poverty impairs cognitive functioning, but most were conducted in a laboratory setting with experimentally induced scarcity.<sup>49-50</sup> Outside the lab, a study conducted in India compared the cognitive capacity of a given sugar cane farmer immediately prior to harvest (when poor) and immediately after the harvest (not poor) and documented a significant decrease in cognitive functioning when resources were scarce.<sup>49</sup> In the U.S., researchers conducted a quasi-experimental analysis comparing measures of cognitive function, risk-taking, and temporal choice for individuals tested before payday to identical measures of individuals tested after payday.<sup>51</sup> There were no significant differences in cognitive function, risk-taking, or intertemporal choices about non-monetary tasks between the two groups of respondents.

Existing literature largely focuses on the effects of short-term variations in financial resources on cognitive capacity and behavior; it is unclear whether a sustained increase in income would generate similar cognitive and behavioral outcomes. On the one hand, we might expect that the immediate, short-term stressors weigh the heaviest on people psychologically and affect their behavior the most. On the other hand, long-term insecurity can also be a significant source of stress. An analysis of the effects of removing low-income youth from SSI suggests that up to 25% of the value of the supplemental income to recipients' welfare is derived from income stabilization effects rather than the increase in income.<sup>52</sup>

In theory, a guaranteed income can address immediate needs while also acting as a form of insurance that allows individuals to take calculated risks and plan further into the future.<sup>53</sup> Income stabilization may also improve financial health by reducing reliance on costly consumption smoothing mechanisms (e.g. payday and title loans).<sup>54</sup> Temporary increases in income do not

provide this long-term security, so the behavioral responses may differ.

Furthermore, it may take some time for people to build habits and access opportunities that promote physical and financial health. Using an original survey of lottery players in Massachusetts, for example, researchers observed a pattern of consumption smoothing in which winners incurred large expenditures early in the payment period before increasing savings.<sup>55</sup> It would also take time to see returns from education and other investments in human capital.



# PILOT STUDY

## OAKLAND, CA

In September of 2016 we launched the first small wave of a pilot study in Oakland, CA, that ran for one year. The first wave included fewer than 10 individuals (including treatment and control), and we will continue to add individuals to the pilot as we refine our approach. We plan to enroll up to 100 by the end of 2017, although the amount of money distributed will be smaller during the pilot.

The purpose of the pilot is to test and improve the study procedures. We do not expect to generate meaningful insight into our research questions with the pilot, as the sample will be far too small and the time horizon too short to simulate the expectation of long-term economic security. Instead, we are using the pilot to test payment mechanisms and other logistics; refine intermediate and final outcome measures; test data collection instruments and methodology; develop strategies for limiting attrition in the control group; and determine whether the experimental protocol is likely to generate insight into the research questions.

In addition to refining the sampling procedure, we hope to learn the following from the pilot:

- ▶ **SURVEY VOLUME AND FREQUENCY:** How do we balance the desire to collect data on many outcomes and intervening variables with the need to keep people engaged? Is it better to send one longer survey each month or a few questions a week?
- ▶ **SURVEY RESPONSE RATES:** Do people complete web-based surveys distributed by e-mail and text message in a timely manner? How much time and effort do we need to spend following up? If attrition is higher among the control group, what strategies can we employ to keep them engaged?
- ▶ **SOCIAL DYNAMICS:** Though the benefit is given to one individual, does the recipient share funds with family and/or friends? If familial or social expectations and pressures lead the recipient to support other individuals who would also receive the income supplement under any form of basic income or cash transfer policy, the experiment will not adequately simulate the conditions that would follow from a policy change. Similarly, if participating in the study negatively affects recipients' interpersonal relationships or leads to other unintended consequences we need to rethink the design.
- ▶ **EXPENDITURE TRACKING:** How useful is the transaction data? Will participants be willing to link other savings and checking accounts to allow us to view expenditures from those accounts as well?
- ▶ **INTERNET ACCESS AND PHONE NUMBERS:** Do participants consistently have access to the internet to complete surveys? Are we able to reach them by phone? If there are problems, is there value in distributing smartphones and service for the duration of the study?
- ▶ **TARGET POPULATION:** What fraction of participants have credit bureau records and appear in administrative data records?
- ▶ **QUESTIONS OF INTEREST:** What are we not asking or collecting data on that we should? Are there pathways of impact that we did not expect?

# RESEARCH DESIGN

## FOR MAIN STUDY

We are planning a randomized controlled trial with 3,000 participants (1,000 treatment, 2,000 control) to examine individuals' response to a sustained increase in unconditional income and the effects of the cash transfers on a range of individual-level outcomes.

## ELIGIBLE POPULATION

**Age and Income Caps.** Currently, we define the eligible population as all individuals between the ages of 21 and 40 whose total household income in the year prior to enrollment did not exceed the area median income (AMI) for their county of residence.<sup>56</sup> We will use stratified random sampling and establish quotas to ensure that the sample is representative across several dimensions and stratify on those characteristics prior to random assignment (see below for details). Although a universal basic income would be distributed to everyone regardless of income level, the benefit received by higher-income individuals would be paid back in taxes in order to fund the program.<sup>57</sup> Additionally, given that the marginal effect of the additional income on many of the outcomes is expected to be relatively small at higher income levels, including this population in our sample would lead us to underestimate the effects of a basic income. Increasing the sample size to a point where this would not be the case would be both unaffordable and an inefficient use of our resources.

**Demographics.** We plan to ensure the sample meets the following quotas:

DEMOGRAPHIC CHARACTERISTICS	STRATIFICATION TARGETS
Race/ethnicity	Includes a minimum of 20% non-Hispanic white, 20% black, 20% Hispanic
Gender	50% male, 50% female
Income level	High (67% of AMI to AMI) - maximum of 15% Medium (33% to 66% of AMI) - minimum of 30% Low (0 to 32% of AMI) - minimum of 30%
OTHER FACTORS TO CONSIDER FOR BALANCE CHECKS*	
Employment status	(employed vs. unemployed)
Children	(individuals with children vs. without at enrollment)
Debt	(overall self-reported non-mortgage debt validated by credit bureau data)

\*We want to avoid an overabundance of cells so we may not block on these variables but we will check to ensure that there is balance between the treatment and control groups.

**Geography.** We currently plan to conduct the study in regions in two states. To select areas for the study within these regions, we plan to take a stratified random sample of Census tracts where median household income is below the AMI. We will stratify the sample based on labor market and sociodemographic characteristics.

In order to reduce the potential for contamination between participants in the study who live in different households (either directly or through changing labor market conditions), we will sample enough tracts such that no more than 1% of people in a tract are sampled.

**Spillover Effects.** We will also obtain information on other members in the recipient's household and ask permission to access their administrative data. This can help us to measure spillover effects. The frequency at which these other members will be surveyed will depend on the budget.

## EXPERIMENTAL DESIGN

**Intervention.** The intervention in this study is an exogenous increase in income in the form of unconditional cash transfers. The transfers will be delivered via direct deposit to a GoBank account registered in participants' names at enrollment. GoBank resembles a reloadable debit card, but it is an account with an online bank that can be used to pay bills and write checks. There are no overdraft fees, and the \$7.95 monthly account fee is waived for study participants. We provide a temporary MasterCard debit card at enrollment and GoBank sends a permanent card that can be used at any store that accepts MasterCard. There is no fee to withdraw cash at any ATM in the GoBank network. Receipt of the treatment transfers and the nominal benefit for the control group is not conditional on participation in any of the research activities and individuals can spend the money however they choose.

**Length of guarantee.** One of the theoretical advantages of a basic income is that it provides a level of economic security that reduces stress and present bias in decision-making, stimulating investments and other behavioral changes that promote long-term economic self-sufficiency. Existing evidence is limited to the effects of short-term variations in financial resources on cognitive capacity and behavior, however, and it is unclear how long an increase in income must be guaranteed to induce the hypothesized changes in behavior. We propose two treatment arms, one of which will receive the basic income payments for 3 years while the other receives a 5-year guarantee. How the treatment group will be divided between these two arms is still to be determined, based on funding constraints.

**Random Assignment.** The sample will be divided randomly between treatment and control groups. We will use block random assignment at the individual level. Members of the control group will receive \$50 per month. Members of the treatment group will receive \$1,000 per month. We currently plan to randomly assign individuals to the groups with a 2:1 control:treatment ratio.

**Long Baseline.** Prior to random assignment, we will distribute additional baseline surveys via text message and e-mail. This allows us to collect multiple data points for variables subject to measurement error to establish a reliable baseline assessment. It also allows us to identify a sample of individuals unlikely to attrit from the survey under the control regime (the unconditional \$50 all subjects will receive monthly during this baseline period), hopefully limiting differential attrition by treatment condition. Finally, this may allow us to save money on the treatment by limiting the presence of likely survey attritors in the treatment group (who we will be paying a basic income but not getting survey data from). After several months of this baseline period, we will assign people who are not reliably responding to surveys to the treatment group with lower probability since we are unlikely to get data from them for the survey outcomes. This allows us to preserve unbiased estimates on the administrative outcomes while increasing precision on the survey outcomes. (Our analysis will account for these differing probabilities of assignment.)

**Treatment of existing benefits for basic income recipients.** Many existing benefits have marginal tax rates that disincentivize work. Any benefits that we seek to preserve could lead us to overestimate the income effect of basic income on labor supply. We are, however, committed to ensuring that receiving the basic income does not interfere with any subjects' current or future eligibility for government programs (e.g. Section 8 vouchers, Medicaid). We do not view cash as an efficient replacement for Medicaid, and the loss of a housing voucher would inflict irreparable long-term harm on participants.

Because we, as a non-profit research organization, are unable to guarantee that participants' benefits will be restored at the end of the study, we are seeking waivers and exemptions to ensure that participants continue to receive benefits for which they are eligible based on their earned income. This can be achieved via administrative rule changes at the state level or legislative action. We are pursuing both routes in the states chosen for the study and will not enroll anyone currently receiving benefits until those waivers are in place.

Although we expect some (but not all) of the benefits we are seeking to preserve might be replaced by a basic income, there are several reasons why preserving the benefits should not affect the relevance of the study or its ability to inform future policy. First, individuals in households currently receiving SSI/SSDI or other social security benefits are ineligible to participate, as they already receive monthly cash income. Individuals in households with a Section 8 voucher are similarly ineligible, as the value of the benefit is large enough that layering on a basic income would reduce the relevance of the study. Because the percentage of eligible individuals that receive a Section 8 voucher is very low, excluding voucher-holders from the sample should not introduce meaningful selection bias.

Unlike housing assistance, however, most other benefits do not have limited availability. Forcing prospective participants to choose between taking up the basic income payments and continuing to receive other benefits like child care assistance would likely lead to nonrandom participation and introduce the sources of bias that formed the basis for critiques of the negative income tax experiments.<sup>58</sup>

Finally, the narrow eligibility criteria and the low benefit levels associated with other programs mean that many individuals in the sample will either be ineligible for existing benefits or the amount they will continue to receive should not affect the interpretation of the results.<sup>59</sup> We will be adjusting for the preservation of existing benefits in the analyses.

## SAMPLING

As described above, we will select areas for the study by taking a stratified random sample of Census tracts in large regions within the two states where median household income does not exceed the area median income. After sampling tracts, we will randomly select addresses within tracts from USPS DSF (a sampling frame of all addresses). We will screen selected addresses for eligibility, ultimately enrolling no more than one percent of individuals within a Census tract. We may use available administrative data eliminate as many ineligible households from the sampling frame as possible to cut down on recruitment and enrollment costs, but we are examining the reliability of this data during the pilot. We are contracting with a survey research firm with extensive experience fielding national studies to assist with sampling, manage recruitment, and conduct in-person enrollment and baseline surveys.

# DATA COLLECTION

## COMPREHENSIVE IN-PERSON SURVEYS

We will conduct at least two comprehensive, in-person surveys: once at baseline and once at endline. The collection of these survey data will be outsourced to a firm experienced in implementing large-scale surveys.

At the time of these surveys, enumerators will likely collect basic health indicators such as height, weight, and blood pressure. Other biomarkers such as saliva, hair, or blood samples may also be collected at this time if such measures are included in the final research design.

## MONTHLY OR BIMONTHLY SURVEYS

We plan to conduct web-based surveys either monthly or every other month throughout the study. Participants will be notified by a text message and an e-mail containing a personalized link to the survey, and we ask them to complete the questionnaire at their convenience within 5 days. We will send reminders to nonresponders, and cash incentive payments will be deposited to participants' GoBank accounts upon completion. We plan to keep the surveys very short to reduce fatigue.

Maintaining regular contact allows us to identify changes in employment, housing, education, and other variables for which a change will trigger an additional module asking about the reasons for change and collecting new data on relevant measures (e.g. housing quality following a move, job satisfaction and earnings for new job, etc.). We will spread the modules to be administered less frequently across months to keep the length fairly consistent. Questions pertaining to variables with higher likelihood for measurement error or misreporting due to difficulty remembering will be asked more frequently.

The survey response literature suggests that the experience of the survey and how entertaining it is can influence follow-up response rates more powerfully than cash incentives. One thing we are exploring with the pilot is how to structure the surveys to avoid survey fatigue.

## TIME USE SURVEYS

The literature describes several possible approaches to measuring time use. Historically, the Time Diary Method, in which respondents make a complete record of all of their activities for given time period, has been used most widely.<sup>60</sup> The diaries are either filled out in real time throughout the day or retrospectively for the prior day. Though comprehensive for the covered time period, activities may not be representative of how respondents generally spend their time and the method is subject to distortion due to delayed recall.

The development of the experience sampling method (ESM) and ecological momentary assessment (EMA) addressed both recall difficulties and susceptibility to normative editing by sending a text message or other notification at random times asking respondents to describe where they are, what they are doing at that moment, who they are with, and how they feel. Notifications can be sent multiple times a day, once a day, etc. Data from ESM and EMA are regarded as the gold standard for measuring quality of life, but the burden on participants is high and it may be difficult to construct a complete account of an individual's time use.<sup>60</sup> The Day Reconstruction Method is a hybrid: respondents construct a diary of the previous day and then answer questions about each "episode" to elicit the feelings and experiences associated with activities (e.g. commuting) and circumstances (e.g. a job with time pressure).<sup>61</sup>

Recent research has used a fourth method, inferring time use from sensors on participants' cell phones. We are exploring the feasibility of this approach.

We are still exploring which methods may be most appropriate to our case. Given the importance of time use as a primary outcome, however, we will likely leverage multiple approaches for robustness and increased comparability to existing research. This is an area where we would especially welcome feedback.

## QUALITATIVE INTERVIEWS

The study will have a substantial qualitative component. We will conduct semi-structured, in-person interviews to better understand the mechanisms of impact, individuals' experiences, the constraints they face, etc. These interviews and qualitative data will be an integral part of the study. We plan to randomly select a subset of the sample (likely 200 individuals) to interview 4 times over the 3 years plus a follow-up one year after the income ends. (Individuals receiving an income for 5 years will be interviewed 6 times over the 5 years with a follow up one year later.) Additional interviews will be scheduled to explore unexpected findings/anomalies in the survey and administrative data and as needed to document causal mechanisms.

## ADMINISTRATIVE DATA



Participants will also be asked to authorize the research team to access information about them in administrative data held at the federal, state, and local levels. This authorization allows us to obtain data on outcome measures without taking participants' time and relying on their ability to recall a large volume of information. The use of administrative data is less intrusive and more reliable, and it will allow us to follow both adults and children for many years after the income payments have ended. Participation is not contingent on their willingness to authorize access to the data, so this information will only be available for consenting participants.

We are working closely with the Center on Poverty and Inequality (CPI) at Stanford University on the entire study, but the CPI is instrumental in embedding the experiment in an administrative data infrastructure. We are also working with research centers at other universities that will assist with assembling and analyzing the administrative data.

**Expenditure data:** GoBank will provide transaction data for the accounts of participants that consent to expenditure tracking. Additionally, we have partnered with Plaid Technologies to build a web application that allows participants to grant access to transaction data from their other checking and savings accounts. Participants enter their username and password once, giving Plaid permission to periodically pull transaction data from the accounts. If participants are willing to link their accounts, this tool will help generate a more complete picture of spending and saving patterns; to our knowledge it will be the first study to do so.

**Credit Bureaus:** A number of recent studies have utilized data from credit bureaus to measure financial outcomes.<sup>62-63</sup> We are negotiating a data sharing agreement to provide periodic data (for consenting participants) on a range of variables, including aggregate non-mortgage balance,

aggregate non-mortgage balance past due, mortgage balance and amount past due, credit card balance and amount past due, auto balance and amount past due, number and balance of third party collections (total + non-medical); number of 30/60/90 days past due or worse items in the past 12 months; number of inquiries all, auto, mortgage; percentage of trades ever delinquent; and indicator variables for prime, sub-prime, etc. based on either FICO scores or other proprietary scores. The first archive will include data for the preceding 3-5 years so we will have historical data for comparison. We may also have access to alternative measures such as use of payday lending if there is adequate coverage of the sample and we can work out an agreement.

### **Additional administrative data sources:**

- ▶ Health: all payer claims database; hospital discharge; emergency department discharge; mortality; birth records
- ▶ Program participation: unemployment insurance, SNAP (food stamps), TANF, etc.
- ▶ Earnings and employment: UI records and/or SSA records and/or IRS data
- ▶ Criminal justice data (arrests, convictions, etc.)
- ▶ Voting records
- ▶ Education: primary, secondary, and postsecondary
- ▶ Motor vehicle registration data



## **OUTCOMES**

### **TIME USE**

**with a focus on the nature and volume of productive activity**

A guaranteed income reduces the immediate need for paid employment to make ends meet. Economic theory suggests that the unconditional cash transfers generate an income effect that may be reflected in reduced hours in the formal labor market. The transfers make leisure more affordable, and some participants may take advantage of the opportunity to allocate more time to leisure. There are, however, other ways in which people could respond to the additional money. Some people might choose to work more in lower-paid but more rewarding employment. Others may take time off and

look for a job that is more fulfilling or of higher quality, or reduce their hours of formal employment while engaging in entrepreneurial or self-employment activities. People with productive alternative uses of their time – most notably parents with children or adults with elderly relatives in need of care–may increase time devoted to their families. Others will use the reduced work hours to engage in productive activities such as further schooling or community college training and volunteer and civic activities in their communities.

Many of these alternative uses of time could have social and economic benefits to the individuals, their households and communities, and society as a whole. Additional education or training may provide a path to long-term economic self-sufficiency, and more time with children may improve a child's developmental and educational outcomes. Though these indirect effects may not be observed in the short term, careful measurement of time use could help to not only document how individuals respond to an exogenous increase in income, but also to provide evidence of indirect effects in longer-term studies. There are important policy implications to this set of outcomes: the savings in social costs as a result of the indirect effects could make a guaranteed income more affordable.

## TIME USE OUTCOMES

### *Employment*

Changes in labor market participation (e.g. withdrawing from or joining the labor market)\*

Reducing or increasing the number of hours worked\*

Shifting labor patterns:

Job satisfaction; shifts from a lower-quality to a higher-quality / more fulfilling job

Self-employment, secondary jobs, and/or entrepreneurial activities

Increasing investment in searching for a job

### *Human Capital Investment*

Education or training of individual\*

Education or training of members of household\*

### *Unpaid Productive Activity*

Child or elder care

Volunteering

Civic or community engagement

### *Leisure*

\* can be measured using administrative data

## SUBJECTIVE WELL-BEING

Quality of life depends on more than objective measures such as economic status and health. People's unique values, expectations, preferences, and previous experiences shape their evaluations of events and circumstances. The concept of subjective well-being is broad; it includes individuals' happiness at a particular point in time as well as their judgments of satisfaction and fulfillment with their life as a whole.<sup>64</sup>

The potential effects of basic income on subjective well-being are numerous and depend in part on individuals' preferences and other characteristics. Expenditures on goods and services that do not have an immediate impact on prioritized outcomes such health, human capital, and financial health may be viewed as less productive. However, these expenditures may positively affect individuals'

self-esteem, self-acceptance, dignity, and pride, and these developments may indirectly contribute to improvements in more tangible areas.<sup>65</sup> Aside from expenditures, a basic income empowers recipients to make decisions about their own lives, and the economic security enables them to plan for the future. Increases in perceptions of competence, autonomy, and relatedness stemming from this freedom can lead to improvements in the nature and quality of interpersonal relationships and strengthen social connections.

The OECD guidelines for measuring subjective well-being identify three components:<sup>66</sup>

- ▶ **Life evaluation**, a reflective assessment on a person's life;
- ▶ **Affect**, a person's feelings or emotional states at a particular time; and
- ▶ **Eudaimonia**, a sense of meaning and purpose in life, or psychological well-being.

We will measure each of these components using well-tested and reliable scales with demonstrated validity. Scales we are currently considering are the Satisfaction With Life Scale (SWLS), as an indicator of life evaluation;<sup>67</sup> the Scale of Positive and Negative Experience (SPANE), a measure of positive and negative feelings, as an indicator for affect;<sup>68</sup> the Basic Psychological Needs Scale (BPNS), a measure of general autonomy, competence, and relatedness, needs which must be satisfied for eudaimonia;<sup>69</sup> and the Flourishing Scale (FS), another indicator of eudaimonia that measures individuals' self-perceived success in important areas such as relationships, self-esteem, purpose, and optimism.<sup>68</sup>



## HEALTH, MENTAL HEALTH, AND COGNITIVE FUNCTIONING

Many low-income families and individuals lead precarious lives. Sometimes this results from poor planning, but in many instances it results from the adverse consequences of events such as illnesses, accidents, and bureaucratic mistakes that more affluent people can easily avoid. Stress and immune systems can be compromised by this precarity, as can the mental bandwidth needed to engage in longer-term planning.

Existing literature and findings from cash transfer programs suggest several possible effects of basic income on health and mental health.

- The additional income may enable individuals who were previously under-utilizing health services to obtain preventative and curative care. Service utilization could increase because the individuals were unable to afford care prior to the increase in income or because the extra money allowed them to work fewer hours and to devote more time to taking care of their health (or the health of members of the household).
- The additional income could increase health insurance coverage, either by making improved coverage more affordable or by providing the time for individuals to identify available plans and enroll.
- The additional income can be used to buy a variety of higher-quality food, and improvements in nutrition can have positive consequences for short- and long-term health. Similarly, recipients could move to higher quality housing in safer neighborhoods or experience more housing stability as a result of the income security. Both of these changes could have positive effects on health and mental health.
- Health could improve due to changes in behavior prompted by the additional income. A recent review of 50 estimates from 19 studies on cash transfers in developing countries found that there was either no significant impact or a significant negative impact of transfers on expenditures on alcohol and tobacco.<sup>70</sup> Studies in the US on the EITC and casino disbursements have also documented reductions in alcohol consumption and smoking, both of which may lead to improvements in health and predictors of future disease.<sup>23-25</sup> Furthermore, the additional income could lead to increases in physical activity and sleep by relieving stress and freeing up time that might otherwise be spent working or dealing with financial issues.
- Improvements in health—resulting from behavioral changes, consumption smoothing, and/or increases in preventative care—could lead to a reduction in utilization of some health services. A reexamination of Canada's guaranteed annual income experiment in the 1970s using health administration data shows a significant decrease in hospitalizations, particularly due to accident, injury, and mental health concerns, and an overall reduction in health service utilization among guaranteed income recipients relative to controls.<sup>71</sup>

The relationship between poverty or economic insecurity and mental health is also well established in the literature. According to the social causation hypothesis, the stress, social exclusion, decreased social capital, and exposure to trauma and violence that often correlate with poverty increase the likelihood that an individual will experience depression, anxiety, substance abuse, and other mental health problems. Conversely, the social drift hypothesis suggests that mental health problems put individuals at a greater risk of poverty and economic insecurity as a result of health care costs, reduced productivity, stigma, and loss of employment and earnings.<sup>72</sup> As there is evidence in support of both pathways, basic income could affect mental health in several ways.

- The increased economic security could relieve stress and other causes of depression and anxiety, leading to improvements in mental health.
- The additional income could help individuals suffering from mental health problems afford treatment, leading to an increase in mental health service utilization.
- In the longer term, the increased access to treatment and ongoing management of mental health issues could result in reductions in the severity of mental illness (and therefore improvements in the indicators used to measure depression and anxiety).

Finally, there is a relatively new strand of literature on the relationships between cognitive functions, human behavior, and economic outcomes that suggests an additional pathway of impact for basic income. Cognitive functions are defined in the cognitive psychology literature as mental processes that control individuals' attention and determine their ability to process information. These processes are necessary for deliberate activities like formulating goals, planning ahead, executing a plan, and acting effectively.<sup>46</sup> Cognitive functions are limited resources, and scarcity (of money, time, etc.) forces people to make constant trade-offs, placing a "load" on cognition. Cognitive resources are also strained by poor nutrition, inadequate sleep, chronic pain, excessive alcohol consumption, and other correlates of poverty.<sup>48</sup> The burgeoning literature on poverty and cognition suggests that the relationship is bi-directional: scarcity causes stress and negativity, inducing people to make shortsighted and risk-averse decisions that perpetuate poverty.<sup>46-49</sup>

In short, cognitive functioning could both be affected by receipt of a basic income and also in turn lead to changes in the other outcomes of interest, such as educational outcomes, productivity, savings and investment behavior, and ability to plan for the future.

There has been great progress in identifying and measuring cognitive functions, and the theoretical connections between these processes and health, economic, and social outcomes are well documented.<sup>73</sup> While there is some empirical evidence, the exact nature of the relationships and the feedback effects are not entirely clear. This study will contribute to our understanding by examining the impact of monthly unconditional cash transfers on two cognitive functions, attention and inhibitory control, that may be of particular importance.

We will measure both cognitive functions using simple tests from the psychology literature: the psychomotor vigilance test for attention and the Stroop test for inhibitory control. These tests are simple to administer via online survey and have been widely adopted, allowing our work to be more comparable with existing studies. We are also piloting other tests and may add to the current protocol.

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## HEALTH-RELATED OUTCOMES

### *Physical Health and Well-being*

Health markers and predictors of future disease (BMI, hypertension, etc.)  
Self-reported health  
Healthy behaviors (nutrition, exercise, alcohol consumption, smoking)  
Health insurance coverage\*  
Health and mental health service utilization\*  
Sleep  
Food security  
Housing quality and stability  
Crime victimization

### *Mental Health*

Depression  
Anxiety

### *Cognitive Functioning and Stress*

Stress (self-reported and cortisol)  
Attention and inhibitory control (e.g. psychomotor vigilance test and Stroop test)

\* can be measured using administrative data



## FINANCIAL HEALTH AND SELF-SUFFICIENCY

We plan to focus on three main components of financial health. The first, resilience, refers to individuals' or households' ability to withstand a shock such as healthcare costs, job loss, or other unexpected expenditures without going bankrupt or similarly upending their lives. The second is the capacity to take advantage of opportunities with future benefits (e.g., to make investments in materials for employment, transportation, education, training, medical care, etc.), while the third is the ability to avoid relying on costly coping strategies to smooth consumption (e.g., use of payday loans, going without medical care, etc.).

With the exception of reliance on costly coping strategies, operationalizing these concepts and developing measurable indicators is more difficult. We will use established survey-based measures of financial health from the Center for Financial Services Innovation and the Consumer Finance Protection Bureau Financial Well-being Scale as overall indicators, but we will also collect data on a range of financial behaviors and outcomes in order to obtain a more complete picture of participants' financial lives. We plan to work with experts in household finance to identify or create more objective measures or indices for resilience using this data.

Evidence from previous cash transfer programs and economic theory suggest several ways in which basic income could affect financial behaviors and outcomes.<sup>74-75</sup>

- Savings could increase, as people have more income and thus a greater capacity to save.
- Conversely, savings could decrease if recipients make investments in physical capital (e.g., transportation, housing, materials for business), human capital (e.g., health, education, reduction in paid labor in order to provide child care, etc.), or goods or services for which they had been saving but had been unable to afford.

- Borrowing could increase if recipients choose to make investments. The additional income and income stability may encourage people to take risks and make investments in their future, and the income could facilitate access to liquidity, credit, and financial products that were previously unavailable to them.
- Conversely, borrowing could decrease, as the stability and increased income reduce the need for people to rely on costly products like payday loans to smooth consumption. People could also use the additional money to pay down outstanding debts.

We will use data on the outcomes listed in the table below to examine the extent to which participants' financial behavior and financial health changes in response to the guaranteed income.

## FINANCIAL OUTCOMES

### *Assets, Savings, Borrowing, and Investment Behavior*

Bank utilization\*  
 Liquid assets  
 Debts/repayment (including use of payday loans, check cashers, etc.)\*  
 Other savings  
 Access to credit/credit utilization\*  
 Investments (including investments in physical capital like a vehicle)\*

### *Cash Flow*

Income\*  
 Expenditures (self-reported and transactions from bank accounts)\*

### *Financial Health*

Center for Financial Services Innovation (CFSI) indicators of financial health  
 Consumer Finance Protection Bureau (CFPB) financial well-being scale

\* can be measured using administrative data



## POLITICAL AND SOCIAL BEHAVIORS

It is possible that a basic income could cause recipients to lead a more engaged civic life or become more trusting of other people and of institutions. We may expect voter turnout, measured by administrative records, and other self-reported forms of participation to increase. In addition, a basic income may change political and social attitudes, including measures of trust in government, economic conservatism, intergroup prejudice, and other-regarding preferences.

## POLITICAL AND SOCIAL OUTCOMES

### *Political and Social Attitudes and Behaviors*

- Voter turnout\*
- Self-reported forms of political participation
- Trust in government
- Economic conservatism
- Intergroup prejudice
- Other-regarding preferences (e.g., dictator game)

### *Social Capital*

- Social interaction and connections
- Satisfaction with interpersonal relationships

\* can be measured using administrative data

## ANTISOCIAL BEHAVIOR: CRIME AND DOMESTIC VIOLENCE

We will gather administrative data on arrests and convictions to estimate whether a basic income reduces criminal activity. Although an arrest does not imply guilt, arrests still represent a use of resources for police and a negative experience for individuals. Basic income may reduce arrests and crime by, for example, improving individuals' emotional states and executive function, reducing some of the incentives for criminal behavior, and allowing individuals to remove themselves from environments that are more conducive to crime. Because of the large negative externalities of criminal activity, it is possible that even a modest decrease in crime would mean the basic income "paid for itself."

### *Anti-Social Behaviors*

- Arrests\*
- Convictions\*
- Domestic violence (self-reported)

\* can be measured using administrative data

## TIME AND RISK PREFERENCES

A basic income provides income stability and a minimum level of economic security. Recipients of the cash transfers – particularly lower-income individuals who were previously accustomed to significant volatility and insecurity – may face different constraints and opportunities when the program is implemented.<sup>75</sup> The ways in which they respond to those new constraints and opportunities depends on their unique time and risk preferences. At the same time, these preferences themselves could change in response to the intervention. The income guarantee is a form of insurance that allows people to plan further into the future and may encourage formerly risk-averse individuals to take calculated risks.<sup>76</sup>

Consequently, time and risk preferences are cross-cutting outcomes; we expect preferences at baseline to affect other outcomes, but we will also gauge the extent to which preferences change over the course of the study. Existing empirical evidence is largely limited to the effects of short-term changes in cash flow, and results vary across studies.

In addition to measuring the observable behavioral outcomes outlined previously, we will employ intertemporal choice tasks, risk choice tasks, and a resource orientation measure (ROM) to elicit present bias, risk aversion, and individuals' relative preferences for time and money.<sup>77</sup> We will adopt measurement strategies widely deployed in other studies to facilitate comparison.

### Time and Risk Preferences

Time preferences (e.g. intertemporal choice tasks)  
 Risk preferences  
 Loss aversion  
 Resource orientation measure

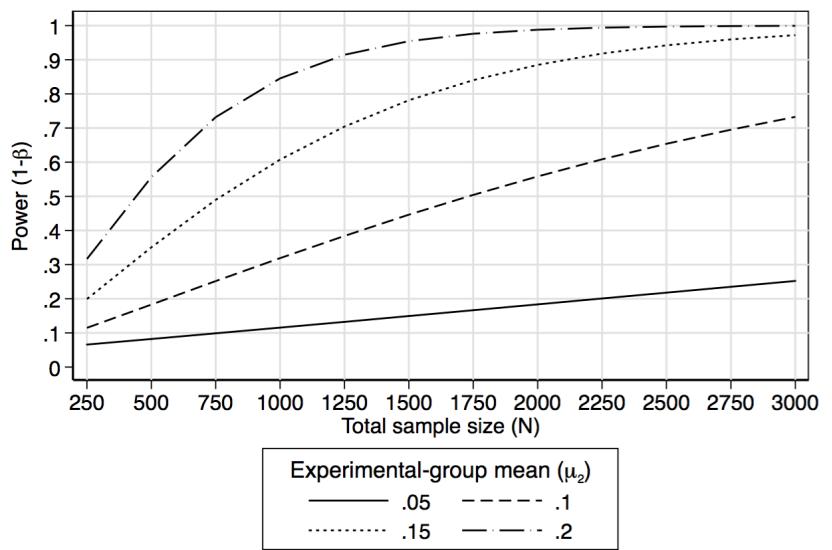
## SPILLOVER AND NETWORK EFFECTS

We also anticipate that the basic income program will have spillover effects and could cause changes in the structure of networks in the communities in which the program will operate. For example, if individuals choose to leave their jobs, they may refer their friends to those jobs, keeping aggregate employment constant. In addition to soliciting a full list of the residents in a household, we will ask subjects to provide a short list of their closest connections, family or friends. We would like to use administrative data to gauge spillover effects on individuals' closest connections.

We are also interested in changes in social networks as a result of the treatment. We are exploring the possibility of using mobile phone data to detect some of these changes. For example, we may be able to observe whether recipients' social networks grow and the intensity of their social interactions. We can also use these data to check whether participants know each other or have overlapping networks.

## POWER CALCULATIONS

Without considering explanatory variables that could substantially improve power, this study is powered to detect an effect size of 0.10 standard deviations at the 5% significance level (two-sided). This calculation assumes 10% attrition in both the treatment and control groups, using the conventional power threshold of 0.8. An effect size of 0.10 standard deviations is comparable to the typical effect sizes found in many studies and below the 0.20 standard deviation that is often used as the cut-off threshold for "small" effect sizes.<sup>78</sup> While there are many outcomes for which we might hypothesize that the treatment would not have as large an effect, given the cost of the treatment, much smaller effect sizes are unlikely to be meaningful. The baseline measurement we plan to conduct will increase power further for some outcomes, although the extent of these improvements is difficult to forecast in advance for many outcomes. A plausible correlation of  $r = 0.7$  ( $R^2 = 0.49$ ) between baseline and follow-up measures on an outcome would increase our power such that an effect of 0.08 standard deviations would be detectable.



On outcomes that are more stable over time, such that  $r = 0.9$ , we would be well-powered to detect 0.05 standard deviation effects.

The figure above shows power as a function of sample size and effect size, given a 1:2 ratio of subjects in the treatment:control group, assuming the worst case of no explanatory pre-treatment variables, and a significance level of 5%.

## PLANS FOR DATA ANALYSIS

This study will be registered with the American Economic Association's RCT registry. All main hypotheses and how they will be tested will be pre-specified in a pre-analysis plan that will be posted prior to the commencement of the study.

As this is a randomized controlled trial, the data analysis will be relatively straightforward. The project team will pay particular attention to attrition and adjust for it as much as possible using the baseline covariates. We will adjust for multiple comparisons by grouping related outcomes into domains and adjusting our p-values within these domains to limit family-wise error rates (FWER).

This study is being conducted to provide credible, academic research upon which future studies could build. Thus, the expected outputs of this project include peer-reviewed articles in leading journals, entailing a high level of rigor and care. We will publicly post de-identified replication data for all results to the extent allowed, although for some government data sources this may not be possible.

## THREATS TO VALIDITY

In this section, we discuss potential threats and limitations that may affect the efficacy of the proposed research design.

First, the study must be credible in the eyes of participants. If they are skeptical that they will receive the supplemental income every month for the duration of the study, we will not observe the behavioral effects of a long-term guaranteed income. Addressing this issue necessitates a two-pronged approach: we need to make the guarantee seem as credible as possible and figure out how to measure perceptions of credibility without raising the issue and influencing perceptions.

Particularly for the survey outcomes, we must remain vigilant about limiting differential attrition, wherein the treatment influences survey response. This is possible for the administrative outcomes as well, however. For example, if the basic income causes people to be less likely to leave the state or more likely to move within the state without updating their records, we may not observe outcomes for treatment subjects for whom we would have observed outcomes had they been in the control group. Currently, we are planning to have a longer pre-treatment period to combat differential attrition. Our main concern is that subjects will be less likely to remain in the study when in the control group; by selecting subjects who remain in the study when they are only receiving \$50 we hope to limit this possibility. In addition, participants will be provided with a smartphone if they do not already have one to help us follow up with them.

Next, we are concerned about a low uptake rate of the treatment and response rate to the initial enrollment. Low response rates will increase our costs and raise questions about the generalizability of our respondents. Anecdotally, our attempts to enroll individuals in the pilot highlighted the

difficulties of door-to-door recruiting. Many houses and apartment buildings in low-income neighborhoods had tall chain link fences and padlocked gates blocking access from the sidewalk to doors, making it very difficult to make contact. Furthermore, the enrollment process takes 45 minutes to 1 hour; many people we did connect with did not have time when we dropped by, and few attempts to follow up were successful. We are planning to improve the response rate by sending potential enrollees a piece of mail on official letterhead describing the study and soliciting a response prior to the in-person baseline survey.

Last, we are concerned about representativeness – both of our respondents to the sampling frame, and of our sampling frame to the broader US population. We would welcome suggestions for variables to measure that are likely to condition or moderate the effects on our outcome variables that would be important in assessing generalizability or could help in producing weights.

## LIMITATIONS

By conducting an RCT with a geographically dispersed sample, we are unable to simulate the macroeconomic conditions of the government introducing a basic income with universal eligibility. If recipients are spending the money helping friends and family who would receive their own income supplement under the policy, the treatment is diluted and the likelihood of the hypothesized effects is undermined.<sup>74</sup> Similarly, the dispersed sample precludes our ability to capture the multipliers and general equilibrium effects identified in the theoretical literature and observed in studies in developing countries.

Despite these limitations, we are proposing a geographically dispersed population for several reasons. First, the intervention is very expensive and our sample size is constrained by the budget. We will not have enough statistical power to detect effects with a geographically saturated study and the increase in sample size required to allow for clustering is financially infeasible. Second, one external shock would eliminate all external validity. Finally, unless we go to a very small town in a rural area, the geographic boundaries of the sample would divide communities and could have a number of harmful consequences.

# NOTES

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